

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

CYWEE GROUP LTD.,

Plaintiff

v.

SAMSUNG ELECTRONICS CO. LTD.
AND SAMSUNG ELECTRONICS
AMERICA, INC.,

Defendants.

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NO. 2:17-CV-00140-RWS-RSP

**DEFENDANTS SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG
ELECTRONICS AMERICA, INC.'S MOTION FOR SUMMARY JUDGMENT
OF INVALIDITY UNDER 35 U.S.C. § 101**

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I. INTRODUCTION

This motion presents a simple question for the Court: Does claiming basic, well-known sensors and other off-the-shelf components convert a mathematical algorithm into patentable subject matter? Plaintiff CyWee Group Ltd.'s ("CyWee") experts admit that the claims of the patents-in-suit set forth an open-ended framework of mathematical equations. It is well established that such claims do not recite patentable subject matter under 35 U.S.C. § 101.

CyWee argues that the patent claims set forth a particular configuration of sensors in a hand-held device and are thus patent eligible. The claims, however, merely recite well-known sensors performing their usual functions without any restriction about how they are physically configured. The prosecution histories confirm that the alleged point of novelty was the claimed algorithms, not the sensors or their configuration. Because there is no plausible reading of the claims that renders them patentable subject matter, Samsung respectfully requests that the Court grants its motion and find the asserted claims invalid under 35 U.S.C. § 101.

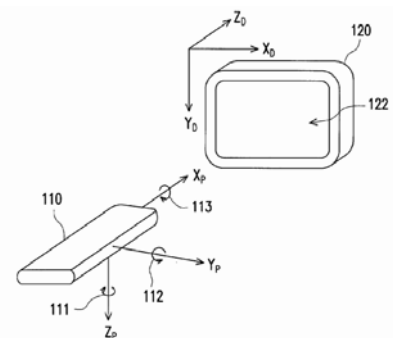
II. STATEMENT OF THE ISSUES TO BE DECIDED BY THE COURT

Algorithms are not patentable subject matter under 35 U.S.C. § 101. CyWee's patent claims merely recite algorithms that operate on data obtained from conventional sensors and were allowed because of the details of those algorithms, not the sensors or their configuration. Given this, are CyWee's patent claims invalid?

III. STATEMENT OF UNDISPUTED MATERIAL FACTS

A. U.S. Patent No. 8,441,438

CyWee has asserted Claims 1, 3–5, 14–17 and 19 of



U.S. Patent No. 8,441,438 (“the ‘438 Patent”) (Ex. 1)¹ against Samsung. These claims are minor variants of the same basic concept of calculating the attitude or orientation of a “3D pointing device” using well-known mathematical formulas. In a parallel lawsuit, in its opposition to Google’s motion to dismiss under Section 101, CyWee mapped a flow chart from the ‘438 Patent to a paraphrased version of the algorithm recited in Claim 14:

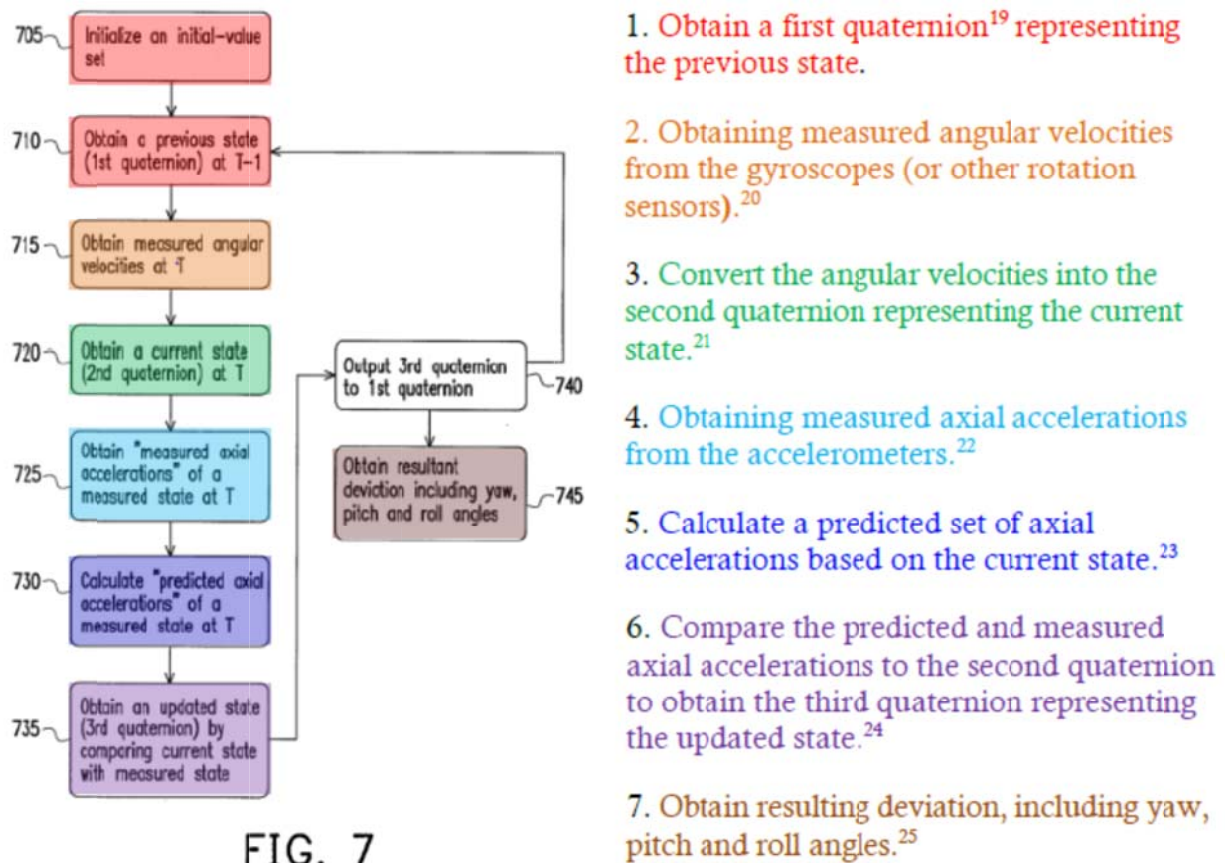


FIG. 7

Ex. 2 at 5.

CyWee further mapped the above to the algorithm literally recited in Claim 14:

A method for obtaining a resulting deviation including resultant angles in a spatial pointer reference frame of a three-dimensional (3D) pointing device utilizing a six-axis motion sensor module therein and subject to movements and rotations in dynamic

¹ Unless otherwise stated, all exhibits referenced herein are attached to the Declaration of Elizabeth L. Brann, filed concurrently herewith.

environments in said spatial pointer reference frame, comprising the steps of:

obtaining a previous state of the six-axis motion sensor module; wherein the previous state includes an initial-value set associated with previous angular velocities gained from the motion sensor signals of the six-axis motion sensor module at a previous time $T-1$;

obtaining a current state of the six-axis motion sensor module by obtaining measured angular velocities ω_x , ω_y , ω_z gained from the motion sensor signals of the six-axis motion sensor module at a current time T ;

obtaining a measured state of the six-axis motion sensor module by obtaining measured axial accelerations A_x , A_y , A_z gained from the motion sensor signals of the six-axis motion sensor module at the current time T and calculating predicted axial accelerations A_x' ,

A_y' , A_z' based on the measured angular velocities ω_x , ω_y , ω_z of the current state of the six-axis motion sensor module without using any derivatives of the measured angular velocities ω_x , ω_y ,

ω_z ; said current state of the six-axis motion sensor module is a second quaternion with respect to said current time T ; comparing the second quaternion in relation to the measured angular velocities ω_x , ω_y , ω_z of the current state at current time T with the measured axial accelerations A_x , A_y , A_z and the predicted axial accelerations A_x' , A_y' , A_z' also at current time T ;

obtaining an updated state of the six-axis motion sensor module by comparing the current state with the measured state of the six-axis motion sensor module; and

calculating and converting the updated state of the six axis motion sensor module to said resulting deviation comprising said resultant angles in said spatial pointer reference frame of the 3D pointing device.

Id. at 5–6.

The sole portion of the claim that is not color coded (aside from the preamble) merely recites comparing velocities in quaternion format to measured and predicted axial accelerations, which is a mathematical operation that CyWee's expert claims is reflected in Equation 11 of the specification. Ex. 3 at 61:20–22. Therefore, all of Claim 14 is directed to a mathematical algorithm.

Claim 14 does refer to structure, such as a “3D pointing device” and a “six-axis motion sensor module,” [REDACTED]

[REDACTED] The '438 Patent itself acknowledges 3D pointing devices were known in the art. Ex. 1, Figs. 1–2, 2:3–47. [REDACTED]

[REDACTED] CyWee admits that configuring gyroscopes or accelerometers into three-axis sensors was known and conventional as of 2010, before the earliest possible priority dates of the asserted patents. Ex. 7 ¶ 9.

The remainder of the intrinsic evidence confirms that the '438 Patent is directed to an algorithm. The specification states that the claims are directed to a mathematical algorithm for calculating the orientation of a 3D pointing device: “The present invention generally relates to a three-dimensional (3D) pointing device utilizing a motion sensor module and method of compensating and mapping signals of the motion sensor module subject to movements and rotations of said 3D pointing device.” Ex. 1 at Col. 1:17–21. The PTO allowed the claims based solely on the algorithm. The claims were rejected in view of Nasiri (U.S. Pat. Pub. 2009/0262074), a reference that discloses a device using accelerometers and gyroscopes.) Ex. 8 at 3–4; Ex. 9. Therefore, CyWee could not argue that the claims were novel because they recite a six-axis motion sensor module or other components. Instead, CyWee obtained allowance of the claims because of the recited algorithm, specifically the fact that the predicted axial accelerations are calculated without using derivatives of the measured angular velocities. Ex. 10.

The other asserted claims are very similar to Claim 14. Claim 1 is an apparatus claim

[REDACTED]

requiring a housing, printed circuit board (“PCB”), a six-axis motion sensor module, and a processing and transmitting module. For the reasons stated above, these structural limitations are merely generic hardware and were never described by CyWee or the inventors as being novel aspect of the claimed invention. Claims 3 and 5 are directed to trivial design elements of the PCB and the data transmitting unit. Claims 4 and 15–17 relate to further specifics of the algorithm. And Claim 19 is essentially the same as Claim 14.

B. U.S. Patent No. 8,552,978

The ’978 Patent claims priority to the ’438 Patent and similarly claims a mathematical algorithm for calculating the attitude or orientation of a 3D pointing device, although at a much higher level. Ex. 11 at Abstract. CyWee has asserted Claims 10 and 12 of the ’978 Patent. Claim 10 recites:

10. A method for compensating rotations of a 3D pointing device, comprising:

generating an orientation output associated with an orientation of the 3D pointing device associated with three coordinate axes of a global reference frame associated with Earth;

generating [sic] a first signal set comprising axial accelerations associated with movements and rotations of the 3D pointing device in the spatial reference frame;

generating a second signal set associated with Earth's magnetism; generating the orientation output based on the first signal set, the second signal set and the rotation output or based on the first signal set and the second signal set;

generating a rotation output associated with a rotation of the 3D pointing device associated with three coordinate axes of a spatial reference frame associated with the 3D pointing device; and

using the orientation output and the rotation output to generate a transformed output associated with a fixed reference frame associated with a display device, wherein the orientation output and the rotation output is generated by a nine-axis motion sensor module; obtaining one or more resultant deviation including a

plurality of deviation angles using a plurality of measured magnetisms M_x , M_y , M_z and a plurality of predicted magnetism M_x' , M_y' and M_z' for the second signal set.

CyWee admits that the '978 Patent claims include the same seven-step algorithm described above with respect to the '438 Patent. Ex. 2 at 4. Unlike the '438 Patent, the '978 Patent incorporates measured and predicted magnetisms generated by a nine-axis motion sensor module. Specifically, Claim 10 uses magnetic data, in combination with angular velocity and axial acceleration data, to determine the direction the 3D pointing device is pointing.

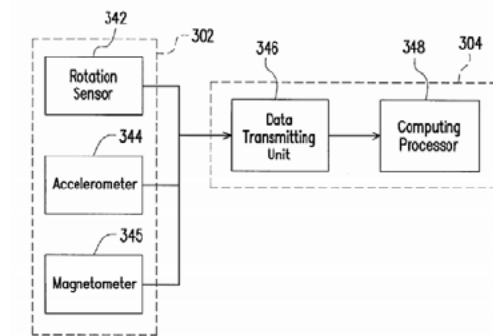


FIG. 4

Notably, Claim 10 does not refer to any structure except for a 3D pointing device, which the '978 Patent specification admits is in the prior art, and a nine-axis motion sensor module. Ex. 11 at Col. 1:29–33. [REDACTED]

[REDACTED] CyWee admits that configuring magnetometers into three-axis sensors was known and conventional as of 2010, before the earliest possible priority dates of the asserted patents. Ex. 7 ¶ 9.

That fact is confirmed in the prosecution history. Similar to the '438 Patent, the '978 Patent application was rejected based on Nasiri, which discloses gyroscopes, accelerometers, and magnetometers. Ex. 12 at 4–5. The claims were eventually allowed after they were amended to incorporate magnetisms into the recited algorithm. Ex. 13 at 2–3.

[REDACTED]

Claim 12 of the '978 Patent depends from Claim 10. Claim 12 merely recites a minor variation in which the orientation of the 3D pointing device can be expressed in one of four commonly known ways, and thus relates closely to the unpatentable mathematical algorithm recited in Claim 10.

IV. LEGAL STANDARD

Summary judgment is appropriate when “there is no genuine issue as to any material fact” and the moving party “is entitled to judgment as a matter of law.” Fed. R. Civ. P. 56(c). 35 U.S.C. § 101 defines patentable subject matter. Judicial precedent has “long held that this provision contains an important implicit exception” in that “[l]aws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014) (citation omitted).

There is a two-step process to determine whether a patent claims ineligible subject matter under 35 U.S.C. § 101. First, the court must “determine whether the claims at issue are directed to one of [the] patent-ineligible concepts”—laws of nature, natural phenomena, or abstract ideas. *Id.* at 2355. The court must “consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform that nature of the claim into a patent-eligible application.” *Id.* at 2356–57 (citations and internal quotation marks omitted). “The abstract ideas category embodies the longstanding rule that an idea of itself is not patentable.” *Id.* at 2355 (internal quotations and alteration marks omitted).

Second, if the court determines that the patent is drawn to an abstract idea or otherwise ineligible subject matter, it must then “examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” *Id.* at 2357. “Stating an abstract idea ‘while adding the words “apply it”’ is

not enough for patent eligibility.” *Id.* at 2358 (quoting *Mayo Collab. Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72, 132 S. Ct. 1289, 1294 (2012)).

V. ARGUMENT

A. *Alice* Step 1: The Asserted Claims Are Directed to an Abstract Concept

1. The Asserted Claims Are Directed to an Unpatentable Mathematical Algorithm for Combining Sensor Data

The asserted claims are plainly directed to an unpatentable mathematical algorithm and therefore fail step 1 of the *Alice* test. Under any plausible reading, the ’438 and ’978 Patents claim a mathematical algorithm for computing the direction a 3D pointing device is pointing by combining two (’438 Patent) or three (’978 Patent) sets of sensor data. It is well-established, however, that abstract principles like mathematical algorithms are not patentable under Section 101. *See Mayo*, 566 U.S. 66, 89 (holding that there is “a bright-line prohibition against patenting . . . mathematical formulas”); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (“[A] scientific truth, or the mathematical expression of it, is not a patentable invention”); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (“If a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory.”) (citing *Parker v. Flook*, 437 U.S. 584, 595 (1978)).

Here, the basic character of the alleged inventions claimed in the ’438 and ’978 Patents is an algorithm for using acceleration, rotational, and/or magnetic data obtained from sensors as inputs into a series of mathematical formulas that calculate attitude or orientation. CyWee has admitted that “the patented inventions teach how to determine a device’s current orientation based on the motion data detected by its motion sensors, such as an accelerometer, gyroscope, and magnetometer.” Ex. 7 ¶ 8. In fact, CyWee’s expert has characterized the inventions as an

open-ended mathematical framework. Ex. 3 at 138:11–14.

Further, the PTO noted that the '438 Patent claims were allowable because of the claimed algorithms. Ex. 10. Claim 10 of the '978 Patent was allowed because it claimed obtaining a deviation using measured and predicted magnetisms. Ex. 13 at 5–6. Indeed, each asserted independent claim recites little more than steps for: (i) “detecting,” “generating” and “obtaining” data and then (ii) “using,” “comparing,” or “calculating” a result using this data.

The Supreme Court’s holding in *Parker v. Flook*, 437 U.S. 584 (1978), is instructive. There, the relevant claim required: (i) measuring a present value; (ii) calculating an updated alarm-limit; and (iii) adjusting the actual alarm limit to the updated value. *Id.* at 585–86. The only difference between the alleged invention and conventional methods of charging alarm limits was the “mathematical algorithm or formula.” *Id.* at 586. The claims were broad but did not cover every conceivable application of the algorithm or formula. *See id.* However, the Court found that the claims were directed to a mathematical formula and thus unpatentable. *Id.* at 593.

Similarly, in *Digitech Image Technologies, LLC v. Electronics for Imaging, Inc.*, the Federal Circuit found that patent claims directed to combining a first data set of color information with a second data set of spatial information was unpatentable under Section 101. 758 F.3d at 1350–51. In so doing, the Court specifically held that “a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible.” *Id.* at 1351.

The asserted claims of the '438 and '978 Patents are analogous to those at issue in *Flook* and *Digitech*. These claims comprise two steps: (i) measuring data—axial acceleration, angular velocity, and/or magnetism; and (ii) applying a mathematical algorithm that combines the data sets to calculate the updated orientation of the device. These are exactly the type of claims that

courts have found to recite unpatentable subject matter.

In opposition to motions from LG and Google in parallel lawsuits, CyWee relied heavily on *Thales Visionix Inc. v. United States*, 850 F.3d 1343 (Fed. Cir. 2017), but that case is unavailing. CyWee is correct that the *Thales* case also related to inertial sensors like those at issue here. The case states that “[i]nertial sensors, such as accelerometers and gyroscopes, measure the specific forces associated with changes in a sensor’s position and orientation relative to a known starting position. . . . [I]nertial systems generally include at least one other type of sensor, such as an optical or magnetic sensor, to intermittently correct these errors that compound over time.” *Thales*, 850 F.3d at 1344–45. However, the relevant claims in *Thales* recited two sensors in a specific physical configuration—one mounted on a tracked object and the other mounted on a moving reference frame. *Id.* at 1345–46. The placement of the sensors was non-conventional and reduced errors “in measuring the relative position and orientation of a moving object on a moving reference frame.” *Id.* at 1348–49. Here, however, none of the asserted claims requires anything specific or non-conventional with respect to the sensors or their configuration. Instead, the sensors are merely to collect data to be used in the allegedly novel recited algorithm.

The patentee’s statements in the prosecution history further demonstrate what CyWee considered to be the innovation over the prior art and the essential aspect of its patent claims. *See Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1348 (Fed. Cir. 2015). To obtain allowance, CyWee pointed to the algorithms recited in the claims, not the claimed sensors or any particular configuration of the sensors. Ex. 10; Ex. 13 at 5–6.

Therefore, the asserted claims fail step one of the *Alice* test.

B. *Alice* Step 2: The Asserted Claims Do Not Recite An Inventive Concept

██████████ the patents’ file histories show that the remaining

elements of the asserted claims merely recite common components and do not contain an inventive concept. “[T]he elements of each claim both individually and as an ordered combination” should be considered to determine whether the additional elements “transform the nature of the claim into a patent-eligible application.” *Alice*, 134 S. Ct. at 2355 (internal quotation marks omitted). A “claim that recites an abstract idea must include ‘additional features’ to ensure ‘that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].’” *Id.* at 2357 (quoting *Mayo*, 132 S. Ct. at 1297) (alteration in original). Those additional features, moreover, must be more than “‘well-understood, routine, conventional activit[ies]’ previously known to the industry.” *Id.* at 2359 (quoting *Mayo*, 132 S. Ct. at 1299) (alteration in original).

Here, the asserted claims of the ’438 and ’978 Patents fail to claim anything more than an abstract mathematical algorithm with, at best, several additional generic components previously known in the industry. The only asserted independent system claim is Claim 1 of the ’438 Patent, which requires a housing, a printed circuit board (“PCB”), a six-axis motion sensor module comprising a rotation sensor and accelerometer, and a processing and transmitting module. Ex. 1 at Claim 1. The remaining asserted independent claims are all method claims listing the steps of the algorithm and referring only to a 3D pointing device and a six-axis or nine-axis motion sensor module. *Id.*, Claims 14, 19; Ex. 11, Claim 10. [REDACTED]

[REDACTED]. The PTO further noted that devices including these components were known in the prior art. Ex. 8 at 3–4; Ex. 12 at 4–5. The remaining limitations recite only algorithmic calculations and resulting data outputs. It is well established that “merely provid[ing] a generic environment in which to carry out the abstract

idea” is insufficient to confer patentability to those limitations. *In re TLI Commc’ns LLC Patent Litig.*, 823 F.3d 607, 611–12 (Fed. Cir. 2016).

The Supreme Court has made clear that the fact that claims may be directed to a specific application of an abstract idea does not by itself render them patentable. In *Diamond v. Diehr*, 450 U.S. 175, 191–92 (1981), the Court explained that the prohibition against patenting an abstract idea such as a mathematical formula “cannot be circumvented by attempting to limit the use of the formula to a particular technological environment.” Although the claims in this case may not cover all uses of the recited algorithms, a modest reduction in the scope of the abstract idea does not render the claims patent eligible. Even with the 3D pointing device limitations, the asserted claims would still have sweeping preemptive effects. This is especially true under the Court’s construction of “3D pointing device,” which (over Defendants’ objections) has been given its plain and ordinary meaning. Dkt. No. 117 at 8.

Therefore, the asserted claims also fail step two of the *Alice* test and are not directed to patentable subject matter.

C. The Dependent Claims Do Not Add Anything of Substance That Would Affect the Patentability of the Claims

Finally, the marginal differences in the dependent claims do not make them patentable. The dependent claims of the ’438 and ’978 Patents merely recite either additional algorithmic steps, slightly different hardware configurations, or different (but commonly known) ways to express the calculated results of the algorithms. Because these limitations are fundamentally directed to the same mathematical algorithms recited in the independent claims, the asserted claims as a whole remain directed to unpatentable subject matter.

Specifically, Claims 3 and 5 of the ’438 Patent are directed to slight variations in the configuration of the foundational hardware used in the claimed algorithm. Claim 3 recites the

printed circuit board of the 3D pointing device being parallel to the housing. Claim 5 recites a generic unit that transmits the data collected from the sensors to an equally generic processor. Neither of these variations changes the fundamental nature of the asserted claims.

Claims 4 and 15 of the '438 Patent merely recite a minor variation in which the change in orientation of the 3D pointing device is expressed in yaw, pitch and roll angles, otherwise known as Euler angles. This is simply a slight difference in how the result of the algorithm is expressed. Like Claims 4 and 15 of the '438 Patent, Claim 12 of the '978 Patent merely recites commonly known methods in how the orientation of the 3D pointing device is expressed.

Likewise, Claim 16 of the '438 Patent recites that various results from the algorithm are expressed in a mathematical format known as a quaternion, which merely represents orientation. Ex. 3 at 45:21–46:11. Again, this is a very minor difference in how the algorithm is executed.

Finally, Claim 17 of the '438 Patent recites nothing more than the additional algorithmic step of setting the initial values to the algorithm. These marginal differences do not change the essential character of what the asserted claims are directed to under *Alice* Step 1, nor do they disclose an “inventive concept” under *Alice* Step 2.

Accordingly, each of the asserted dependent claims are also unpatentable under 35 U.S.C. § 101.

VI. CONCLUSION

CyWee's own experts admit that the '438 and '978 Patents are drawn solely to an open-ended mathematical framework. This claimed algorithm can be implemented on any device with sensors. Such mathematical formulas are quintessentially unpatentable abstract ideas. Therefore, Samsung respectfully requests that the Court grant its motion for summary judgment and find the claims of the '438 and '978 Patents unpatentable under 35 U.S.C. § 101.

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Respectfully submitted,

By: /s/ Christopher W. Kennerly

Christopher W. Kennerly
TX Bar No. 00795077
chriskennerly@paulhastings.com
PAUL HASTINGS LLP
1117 S. California Ave.
Palo Alto, California 94304
Telephone: (650) 320-1800
Facsimile: (650) 320-1900

Elizabeth L. Brann (*pro hac vice*)
CA Bar No. 222873
elizabethbrann@paulhastings.com
Bob Chen (*pro hac vice*)
CA Bar No. 273098
bobchen@paulhastings.com
PAUL HASTINGS LLP
4747 Executive Drive, 12th Floor
San Diego, California 92121
Telephone: (858) 458-3000
Facsimile: (858) 458-3005

Melissa R. Smith
TX Bar No. 24001351
melissa@gillamsmithlaw.com
GILLAM & SMITH, LLP
303 S. Washington Ave.
Marshall, TX 75670
Telephone: (903) 934-8450
Facsimile: (903) 934-9257

Attorneys for Defendants
SAMSUNG ELECTRONICS CO., LTD AND
SAMSUNG ELECTRONICS AMERICA,
INC.

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing document was filed electronically in compliance with Local Rule CV-5 on October 3, 2018. As of this date, all counsel of record had consented to electronic service and are being served with a copy of this document through the Court's CM/ECF system under Local Rule CV-5(a)(3)(A) and by email.

/s/ Christopher W. Kennerly
Christopher W. Kennerly

CERTIFICATE OF AUTHORIZATION TO SEAL

I hereby certify that under Local Rule CV-5(a)(7), the foregoing document is filed under seal pursuant to the Court's Protective Order entered in this matter.

/s/ Christopher W. Kennerly
Christopher W. Kennerly